Indiana Department of Environmental Management
Office of Air Quality

Technical Support Document (TSD) for a General Federally Enforceable State Operating Permit (FESOP) for an Asphalt Plant

The Office of Air Quality (OAQ) has developed a General Federally Enforceable State Operating Permit (FESOP) for asphalt pavement production plants pursuant to 326 Indiana Administrative Code (IAC) 2-8-18. The operator of an asphalt plant otherwise subject to Part 70 that can meet the criteria of the General FESOP may, at the operator's option, apply for either the General FESOP or for a regular FESOP. The General FESOP requires the operator to: accept a production limitation of 600,000 tons of asphalt mix for every twelve (12) consecutive month period; control particulate matter emissions from the dryer/mixer process exhaust system with a baghouse type control device; limit all emissions of particulate matter less than 10 microns in diameter (PM-10) to less than 0.13 pounds of PM-10 for every ton of asphalt mix; and limit visible emissions from the process exhaust to less than twenty percent (20%) opacity. These limits will result in permitted air pollution emissions that are less than half of those allowed by a regular FESOP. In addition, to qualify the plant must have received a previous construction permit and be in compliance with all other air pollution control rules. The General FESOP does not allow operation in any area that is in severe nonattainment for a National Ambient Air Quality Standard.

During the development of the general permit, options for the daily monitoring the emissions from the baghouse were studied. IDEM determined that visible emission monitoring of the baghouse exhaust can be an effective method of ensuring continual compliance with the permit emission limitations and standards.

An operator may wish to apply for a General FESOP because it contains some advantages over the regular FESOP. The General FESOP allows two asphalt plants, owned or operated by the same business, to operate at one location if both plants have General FESOPs. Currently, this could be done only if the two plants modified their regular FESOPs or they had Title Vs. The General FESOP makes the collocation of two plants possible without a permit modification. Since the draft General FESOP has been through a public review period, the General FESOP can be issued soon after the operator applies for it, without going through additional public notice or public review of a draft permit.

Permitted Emission Units and Pollution Control Equipment

The source is an asphalt plant composed of the dryer/ mixer (either batch or drum type), a dryer/mixer burner and dryer/mixer exhaust system controlled by a baghouse, conveying equipment, liquid asphalt/oil heater(s), liquid storage tanks, aggregate storage piles, and handling equipment. The asphalt plant may also include electrical generators. This source may include the insignificant activities, as defined in 326 IAC 2-7-1(21).

Potential To Emit After Issuance

The operational emission limitations of the General FESOP keep air pollution emissions to less than (50) tons of PM-10, sulfur dioxide, volatile organic compounds, carbon monoxide, and nitrogen oxide emissions during any twelve consecutive months.

Production Limitation:

The asphalt plant shall not exceed a total production of 600,000 tons of asphalt mix per twelve (12) consecutive month period.

Burner Fuel Limitations:

The fuel combusted by the dryer/mixer burner, hot oil heaters, and all other combustion equipment shall be limited as follows:

(a) Natural gas combusted shall not exceed 180 million cubic per twelve (12) consecutive month period rolled on a monthly basis,

(b) Distillate (#2) combusted shall have a sulfur content less than or equal to 0.50 percent and shall not exceed 1,200,000 gallons per twelve (12) consecutive month period rolled on a monthly basis,

(c) The amount of propane/butane that can be burned shall not exceed 1,800,000 gallons per twelve (12) consecutive month period rolled on a monthly basis,

(d) Waste oils combusted shall have a sulfur content less than or equal to 1 percent and shall not exceed 600,000 gallons per twelve (12) consecutive month period rolled on a monthly basis, or

(e) That fuels allotments in subparts a) through d) of this condition shall be adjusted when combusting more than one fuel per twelve (12) consecutive month period rolled on a monthly basis to maintain emissions below fifty tons. The following equations can be used to make the adjustments:

Nitrogen oxide emission calculation

$$N = \frac{G(E_G)+O(E_O)+P(E_P)+B(E_B)+W(E_W)+D(E_D)}{2{,}000 \text{ lbs/ton}}$$

where:
N=tons of nitrogen oxide emissions for a 12 month consecutive period
Fuel usage
G=cubic feet of natural gas used for the last 12 months
O=gallons of oil used for last 12 months with less than or equal to 0.5% sulfur content
P=gallons of propane used for the last 12 months
B=gallons of butane used for the last 12 months
W=gallons waste oils used for the last 12 months with less than or equal to 1% sulfur content
D=gallons of distillate oil used for the last 12 months for electric generation units

Emission Factors for Nitrogen Oxide
E_G= 280 lb/million cubic feet of natural gas
E_O=24 pounds/1000 gallons of oil
E_P=19 pounds/1000 gallons of propane
E_B=21 pounds/1000 gallons of butane
E_W=19 pounds/1000 gallons of waste oil
E_D=616 pounds/1000 gallons of distillate oil

Sulfur dioxide emission calculation

$$S = \frac{G(E_G)+O(E_O)+(P+B)(E_P)+W(E_W)+D(E_D)}{2{,}000 \text{ lbs/ton}}$$

where:
S=tons of sulfur dioxide emissions for 12 month consecutive period
Fuel Usage
G=cubic feet of natural gas used in last 12 months
O=gallons of oil used in last 12 months with less than or equal to 0.5% sulfur content
P=gallons of propane used in the last 12 months
B=gallons of butane used for the last 12 months
W=gallons of waste oil used in the last 12 months less than or equal to 1% sulfur
D=gallons of distillate oil used in the last 12 months for electric generation units

Emission Factors for Sulfur dioxide
E_G= 0.6 pounds/million cubic feet of natural gas
E_O=71 pounds/1000 gallons of oil
E_P= 0.02 pounds/1000 gallons of propane/butane
E_W=147 pounds /1000 gallons of waste oil
E_D=41 pounds/1000 gallons of distillate oil

Liquid binders used in the production of cold mix asphalt shall be defined as follows:

(a) Cut back asphalt rapid cure, containing a maximum of 25.3% of the liquid binder by weight of VOC (solvent) and 95% by weight of VOC (solvent) evaporating.

(b) Cut back asphalt medium cure, containing a maximum of 28.6% of the liquid binder by weight of VOC (solvent) and 70% by weight of VOC (solvent) evaporating.

(c) Cut back asphalt slow cure, containing a maximum of 20% of the liquid binder by weight of VOC (solvent) and 25% by weight of VOC (solvent) evaporating.

(d) Emulsified asphalt with solvent, containing a maximum of 15% of liquid binder by weight of VOC solvent and 46.4% by weight of the VOC (solvent) in the liquid blend evaporating. The percent oil distillate in emulsified asphalt with solvent liquid, as determined by ASTM, must be 7% or less of the total emulsion by volume

(e) Other asphalt with solvent binder, containing a maximum 25.9% of the liquid binder of VOC (solvent) and 2.5% by weight of the VOC (solvent) evaporating

The liquid binder used in cold mix asphalt production shall be limited as follows:

(a) Cutback asphalt rapid cure liquid binder usage shall not exceed 50 tons of VOC solvent per twelve (12) consecutive month period rolled on a monthly basis.

(b) Cutback asphalt medium cure liquid binder usage shall not exceed 68 tons of VOC solvent per twelve (12) consecutive month period rolled on a monthly basis.

(c) Cutback asphalt slow cure liquid binder usage shall not exceed 190 tons of VOC solvent per twelve (12) consecutive month period rolled on a monthly basis.

(d) Emulsified asphalt with solvent liquid binder usage shall not exceed 102 tons of VOC solvent per twelve (12) consecutive month period rolled on a monthly basis.

(e) Other asphalt with solvent liquid binder shall not exceed 1,900 tons of VOC solvent per twelve (12) consecutive month period rolled on a monthly basis.

(f) The VOC solvent allotments in subpart (c)(1) through (c)(5) of this condition shall be adjusted when more than one type of binder is used per twelve (12) month consecutive period rolled on a monthly basis. In order to determine the tons of VOC emitted per each type of binder, use the following formula and divide the tons of VOC solvent used for each type of binder by the corresponding adjustment ratio listed in the table that follows.

$$\frac{\text{Tons of solvent contained in binder}}{\text{Adjustment ratio}} = \text{tons of VOC emitted}$$

Type of binder	tons VOC solvent	adjustment ratio	tons VOC emitted
cutback asphalt rapid cure		1	
cutback asphalt medium cure		1.36	
cutback asphalt slow cure		3.8	
emulsified asphalt		2.04	
other asphalt		38	

The table below summarizes the potential to emit, reflecting all limits, of the emissions units. Any control equipment is considered enforceable only after issuance of this Federally Enforceable State Operating Permit and only to the extent that the effect of the control equipment is made practically enforceable in the permit.

	Potential to Emit After Issuance (tons/year)						
Process/emission unit	PM	PM-10	SO_2	VOC	CO	NO_X	HAPs
combustion worst case fuel	--------	-------[1]	44.10	0.36	3.60	25.20	----------
aggregate drying/ mixing	100.51[2]	39.00[3]	----------	1.74[4]	----------	----------	1.74
conveying/ handling	0.83	0.08	----------	----------	----------	----------	----------
storage	2.50	0.88	----------	----------	----------	----------	----------
unpaved roads	10.16	3.56	----------	----------	----------	----------	----------
cold mix production	--------	--------	----------	47[5]	----------	----------	----------
Total PTE After Issuance	114.00[6]	43.52	44.10	49.1	3.60	25.20	1.74

1. The PM-10 from combustion is reflected in the results for the aggregate drying.
2. A conservative assumption was made that the source would be operating 8760 hrs/yr with a limited emission rate of 22.95 lbs/hr which is based on 0.03 grains/dscf and a conservative assumption of an exhaust rate of 90,000cfm.
3. The dryer/mixer process exhaust system is limited to less than 0.13 pounds of PM-10 per ton of asphalt mix. The source is limited to producing 600,000 tons of asphalt per twelve consecutive months; therefore, the aggregate drying/ mixing process can only emit 39 tpy of PM-10.
4. VOC emissions from hot aggregate mixing are based on the assumption that the HAP emission are all volatile organic compounds.
5.The tons of VOC solvent used in the production of cold mix per 12 consecutive period is limited so that the VOC emissions emitted is limited to 47 TPY.
6. PM is limited such that two asphalt plants operating under the General FESOP can co-locate and still be below the threshold level for PSD. The other pollutants are limited as well so that two asphalt plants operating under the General FESOP can co - locate and stay below the threshold levels for Title V requirements.

County Attainment Status

Volatile organic compounds (VOC) and oxides of nitrogen (NOx) are precursors for the formation of ozone. Therefore, VOC and NO_X emissions are considered when evaluating the rule applicability relating to the ozone standards. The source will be able to locate in any county that is not designated as Severe Nonattainment.

Federal Rule Applicability

40 CFR 60.90 Subpart I (Standards of Performance for Hot Mix Asphalt Facilities)

The visible emissions from the hot mix asphalt facility shall not exceed twenty (20%) percent opacity. Particulate matter emissions from hot mix asphalt facility shall not exceed 0.04 grains per dry standard cubic foot (gr/dscf).

40 CFR 63 Subpart A (Hazardous Air Pollutants) & 326 IAC 20-1.

This asphalt plant is not subject to the requirements of the National Emission Standards for Hazardous Air Pollutants (NESHAPs).

40 CFR Part 60.116 Subpart Kb (Volatile Liquid Storage Tanks) & 326 IAC 12 & 326 IAC 2-8-18.

Pursuant to New Source Performance Standard (NSPS), 326 IAC 12,(40 CFR Part 60.116b only, Subpart Kb), and 326 IAC 2-8-18, the permittee shall maintain accessible records for the life of storage tank(s). These records shall include:

(a) The date the tank was manufactured,

(b) The dimension of the storage vessel,

(c) An analysis showing the capacity of each storage vessel, and

(f) The vapor pressure of the VOC stores; indicating the minimum true vapor pressure of the VOC is less than 15 kPa.

State Rule Applicability - Entire Source

326 IAC 1-5-2 (Emergency Reduction Plans; Submission)

The permittee shall prepare and submitt a written emergency reduction plan (ERP).

326 IAC 2-8-4(3)(C) & 326 IAC 2-1.1-11 (General Reporting Requirements)

To affirm that the source has met all the compliance monitoring requirements stated in this permit the source shall submit a Quarterly Compliance Monitoring Report. Any deviation from the requirements and the date(s) of each deviation must be reported. Any deviation from the requirements and the date(s) of each deviation must be reported. The Compliance Monitoring Report shall include the certification by the Authorized Individual, as defined by 326 IAC 2-1.1-1(1).

326 IAC 2-8-4(9) (Preventive Maintenance)

A Preventive Maintenance Plan, in accordance with Section B - Preventive Maintenance Plan, of this permit, is required for this facility and its control device. The Preventive Maintenance Plan will be kept on site.

326 IAC 2-8-5(1) (Testing Requirements)

The Permittee shall perform PM and PM-10 testing. The required testing shall be conducted on the following schedule:

(a) New asphalt plants shall be stack tested within 60 days after achieving maximum production rate, but no later than 180 days after initial start-up.

(b) A test for existing plant shall be repeated at least once every seven (7) years. The seven (7) year period shall be from the date of last valid compliance demonstration test.

(c) Existing plants that have not conducted a stack test shall submit a test protocol no later than 180 days after issuance this permit.

Test procedures shall be Methods 5, 9, or 17 (40 CFR 60, Appendix A) for PM and Methods 201 or 201A and 202 (40 CFR 51, Appendix M) for PM-10, or other methods as approved by the Commissioner. The PM-10 emissions includes filterable and condensibles PM-10

326 IAC 2-8-5(a)(1) (Annual Compliance Certification)

The Permittee shall annually submit a compliance certification report which addresses the status of the sources compliance with the terms and conditions contained in this permit, including emission limitations, standards, or work practices. The certification shall cover the time period from January 1 to December 31 of the previous year, and shall be submitted in letter form no later than April 15.

326 IAC 2-6 & 326 IAC 2-8-4(3) (Emission Statement)

Permittees located or relocated in in Clark, Elkhart, Floyd, Lake, Marion, Porter, St. Joseph and Vanderburgh counties as specified in 326 IAC 2-6-1 shall submit an emission statement certified pursuant to the requirements of 326 IAC 2-6. This annual statement must be received by April 15 of each year and must comply with the minimum requirements specified in 326 IAC 2-6-4. The submittal should cover the period defined in 326 IAC 2-6-2(8) (Emission Statement Operating Year).

326 IAC 5-1 (Visible Opacity Limitations)

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following, unless otherwise stated in this permit:

(a) Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Exemptions), opacity shall meet the following, unless otherwise stated in this permit:

(7) Opacity in Clark, Dearborn, Dubois (Bainbridge Township), Marion, St. Joseph, Vanderburgh and Vigo counties shall not exceed an average of thirty percent (30%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(8) Opacity in remaining counties, except Lake County, shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(9) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings) as measured according to 40 CFR 60, Appendix A, Method 9.

State Rule Applicability - Individual Facilities

236 IAC 6-1 & 326 IAC 2-8-18 (Particulate Matter Emission Limitations)

Pursuant to 326 IAC 6-1-2(a) and 326 IAC 2-8-18 (b), the Dryer/Burner Process Stack particulate matter (PM) emissions in the baghouse gas shall not exceed 0.03 grains per dry standard cubic foot.

326 IAC 6-3-2 (Process Operations) 10/9/01

The particulate matter (PM) from the from the dryer/mixer process exhaust system shall be limited by product production limitations and 326 IAC 6-1.

326 IAC 8-5-2 (Volatile Organic Compounds)

The VOC solvent used as diluent in the liquid binder used in cold mix asphalt production from the plant shall be limited such that no more than 47 tons of VOC are emitted per twelve (12) consecutive months. This shall be achieved by limiting the total VOC solvent of any one selected binder to not exceed the stated limit for that binder during the last twelve (12) months. When more than one binder is used, an adjustment ratio must be applied so that the total VOC emitted does not exceed 47 tons per twelve (12) consecutive month period.

329 IAC 13-8 (Used Oil Requirements)

(a) Pursuant to 329 IAC 13-3-2 (Used Oil Specifications), used oil burned for energy recovery that is classified as off-specification used oil fuel shall comply with the provisions of 329 IAC 13-8 (Used Oil Burners Who Burn Off-specification Used Oil For Energy Recovery), including:

(1) Receipt of an EPA identification number as outlined in 329 IAC 13-8-3 (Notification),

(2) Compliance with the used oil storage requirements specified in 329 IAC 13-8-5 (Used Oil Storage), and

(3) Maintain records pursuant to 329 IAC 13-8-6 (Tracking).

(b) The waste oil burned in the dryer/mixer burner shall comply with the used oil requirements specified in 329 IAC 13 (Used Oil Management). The burning of mixtures of used oil and hazardous waste that is regulated by 329 IAC 3.1 is prohibited at this source.

Compliance Requirements

Permits issued under 326 IAC 2-8-18 are required to demonstrate compliance with applicable state andfederal rules on a more or less continuous basis. All state and federal rules contain compliance provisions, however, these provisions do not always fulfill the requirement for a more or less continuous demonstration. When this occurs IDEM, OAQ, in conjunction with the source, must develop specific conditions to satisfy 326 IAC 2-8-4. As a result, compliance requirements are divided into two sections: Compliance Determination Requirements and Compliance Monitoring Requirements.

Compliance Determination Requirements in Section D of the permit are those conditions that are found more or less directly within state and federal rules and the violation of which serves as grounds for enforcement action. If these conditions are not sufficient to demonstrate continuous compliance, they will be supplemented with Compliance Monitoring Requirements, also Section D of the permit. Unlike Compliance Determination Requirements, failure to meet Compliance Monitoring conditions would serve as a trigger for corrective actions and not grounds for enforcement action. However, a violation in relation to a compliance monitoring condition will arise through a source=s failure to take the appropriate corrective actions within a specific time period.

The compliance monitoring requirements are applicable to this source are as follows:

(a) Visible emission notations from the dryer/burner stack exhaust shall be performed by a trained employee twice in the morning and twice in the afternoon and recorded. The readings shall be separated by at least 1 hour. A trained employee is an employee who has worked at the plant at least one (1) month and has been trained in the appearance and characteristics of normal visible emissions for that specific process. The observance of visible emissions, not including condensed water vapor, from the above dryer/ burner exhaust stack or baghouse shall require the implementation of the Compliance Response Plan. The notation records shall indicate when the dryer /burner is not operating during a production day. The days that no production is generated, only one notion shall be required. The Compliance Response Plan for this source shall contain troubleshooting contingency and response steps and response steps that when visible emissions are observed shall be implemented.

(b) The inlet temperature to the baghouse shall be maintained within a range of 200-400 degrees Fahrenheit to prevent overheating of the bags and to prevent low temperatures from mudding up the bags. In the event that bag failure has occurred due to rupture, melting, etc., corrective action shall be taken. The Preventive Maintenance Plan for this unit shall contain troubleshooting contingency and corrective actions for when the inlet temperature reading is outside of the above mentioned range for any one reading. The baghouse shall shutdown for visual inspection within 24 hours and bags shall be replaced as needed.

(c) Daily visible emission notations of the conveyers, material transfer points, aggregate storage piles, and unpaved roads shall be performed during normal daylight operations. A trained employee shall record whether emissions are normal or abnormal. For processes operated continuously, “normal” means those conditions prevailing, or expected to prevail, eighty percent (80%) of the time the process is in operation, not counting startup or shutdown time. In the case of batch or discontinuous operations, readings shall be taken during that part of the operation that would normally be expected to cause the greatest emissions. A trained employee is an employee who has worked at the plant at least one (1) month and has been trained in the appearance and characteristics of normal visible emissions for that specific process. The observance of visible emissions, not including condensed water vapor, from the dryer/mixer process exhaust system shall require the implementation of the Compliance Response Plan. The Compliance Response Plan for this unit shall contain troubleshooting contingency and response steps for when an abnormal emission is observed.